Information Systems Program

1988 Planning Report

INPUT

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USM2-DT1-1

Topics

- Research Methodology
- IS Environment—1987 versus 1988
- Information Systems Budget
- Application Development—
  Issues & Trends
- Directions into the 1990's

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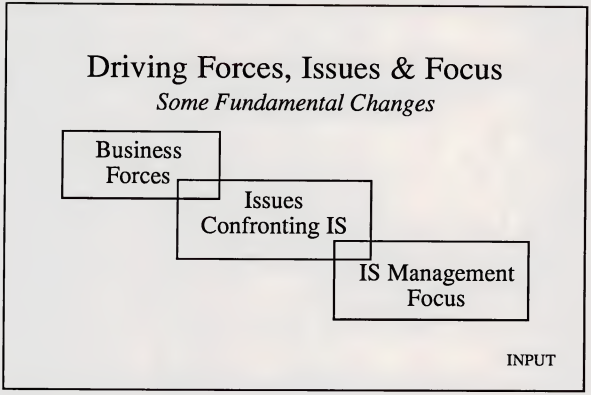

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Information Systems Environment 1987 versus 1988

Driving Forces

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Driving Forces—1987

- Rising Expectations of Senior Management
- Cost-Sensitive Business Environment
- Ability to Conceptualize More Complex Applications
- Expanding Wealth of Powerful Technology
- Unstable Organizational Environment

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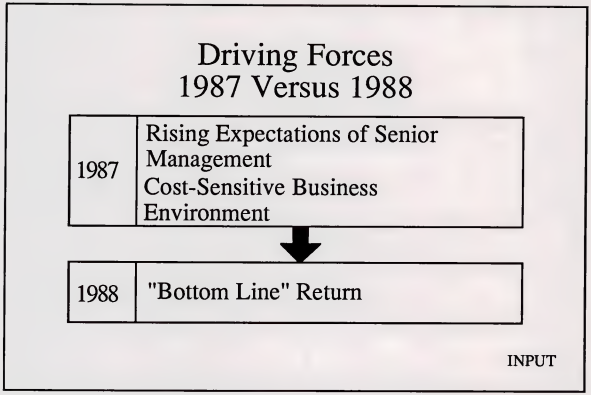

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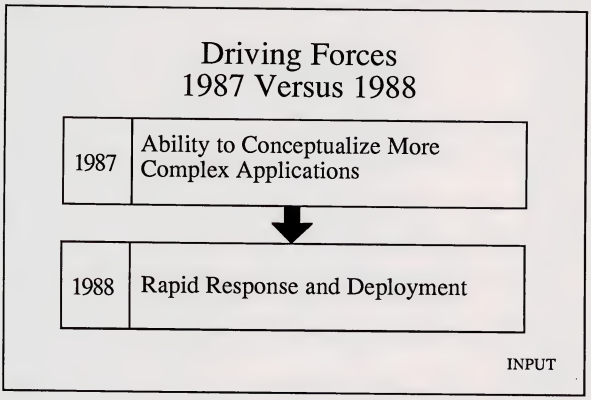

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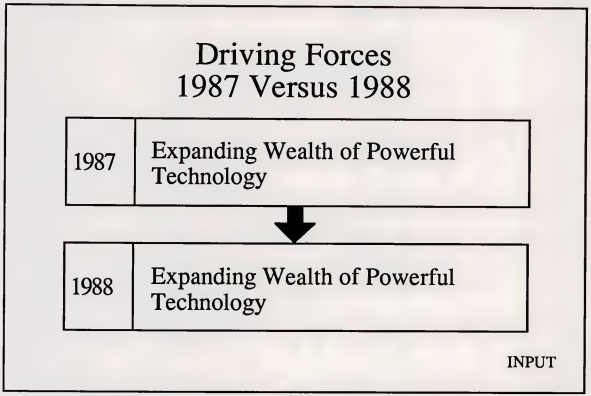

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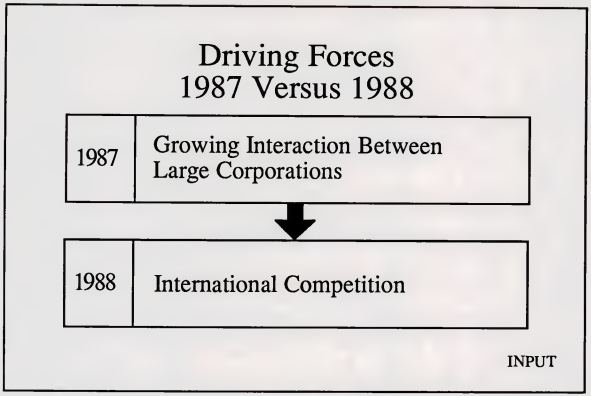

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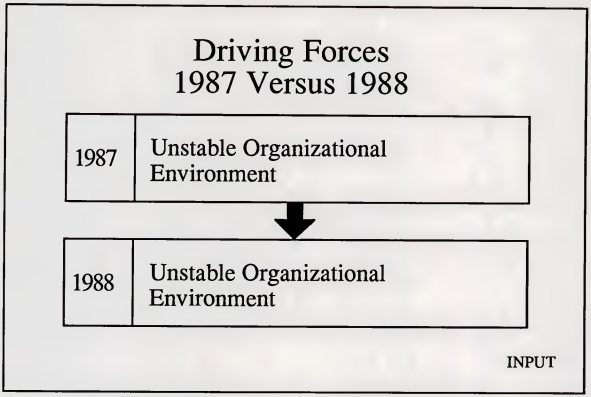

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Driving Forces—1988

- "Bottom Line" Return
- Rapid Response and Deployment
- Expanding Wealth of Powerful Technology
- International Competition
- Unstable Organizational Environment

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Information Systems Environment 1987 versus 1988

Major Issues

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Major Issues—1987

- Business Contribution
- Connectivity
- Development Productivity
- Data Management
- Integration
- User Involvement

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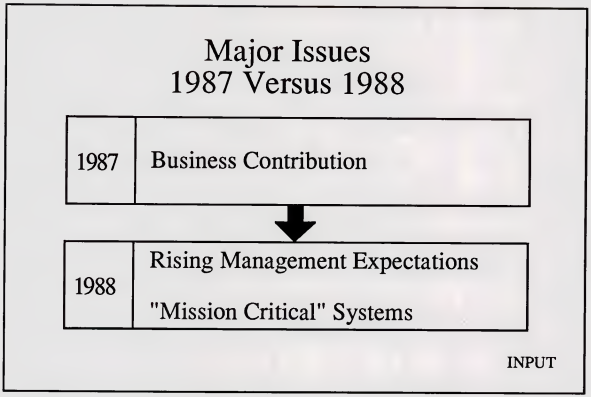

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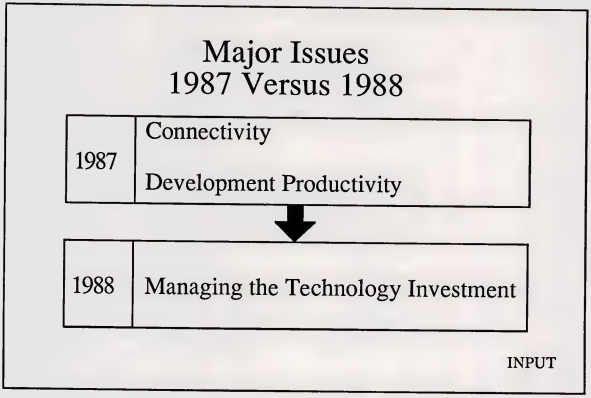

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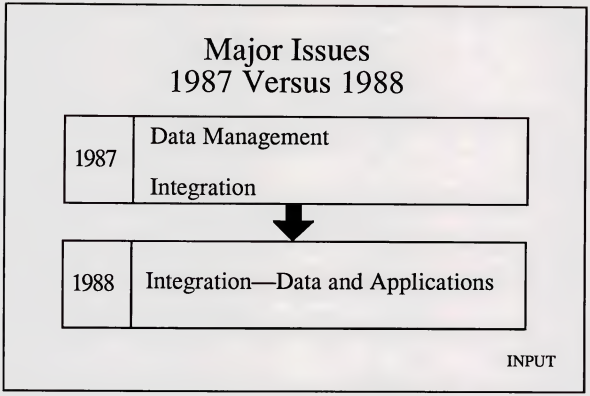
USM2-DT1-18



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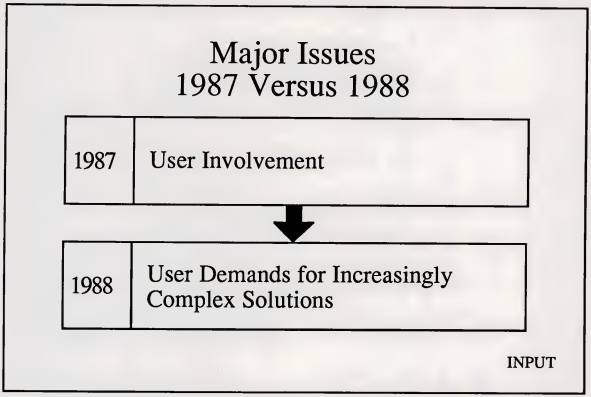

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USM2-DT1-20

Major Issues—1988

- Rising Management Expectations
- User Demands for Increasingly Complex Solutions
- Managing the Technology Investment
- Integration—Data and Applications
- Development Productivity
- "Mission Critical" Systems

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NOTES:

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Major Issues

Survey Results

Issue	% Responses
General Economy	1
Industry Specific	10
Organization	4
Technology	27
Managing IS	25
IS Direction	9
Applications Needs	14

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Information Services Vendor Shortcomings

Issue	% Responses
Integration	4
Connectivity	11
Standards	3
Application Solutions	12
Development Environment	6
Support	29
On-Time Delivery	6
Cost Control	9
Industry Knowledge	5
NO PROBLEMS	15

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Information Systems Budget

1987-1989 Trends

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Factors Affecting IS Budget

(Percent)

Factor	'88	'89
Economy	4	5
Industry Climate	4	4
Organization Climate	23	22
IS Staff Costs	16	14
Technology Costs	39	45
Organization	6	3
Competition	1	1
Major Projects	7	6

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NOTES:

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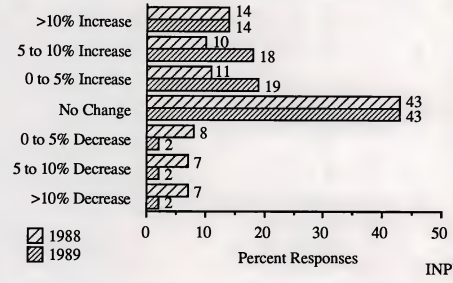
Information Systems Organization Changes in Staff



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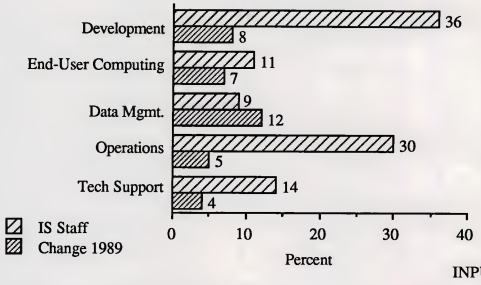
Information Systems Organization
Distribution of Staff



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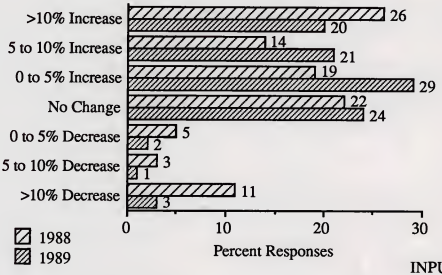
NOTES:

USM2-DT1-27

Information Systems Budget Growth Rates



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NOTES:

USM2-DT1-28

Information Systems Budget
Budget Distribution and Growth

(Percent)

Category	'87	'88	'88 (Growth)	'89 (Growth)
Personnel	41	38	-7	2
Computer Hardware	25	26	4	4
Communications	9	11	22	5
External Product & Services	14	15	7	2
Other	11	10	-9	0

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NOTES:

USM2-DT1-29

Information Systems Budget
Computer Hardware

(Percent)

Category	'87	'88	'88 (Growth)	'89 (Growth)
Mainframes	43	45	5	4
Minicomputers	13	12	-8	2
Micros	9	9	0	7
Mass Storage	18	17	-6	1
Other	17	17	0	1

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Information Systems
Planned Computing Technologies

(Percent)

Development	12	Networking	14
AI/Expert Sys	8	Voice/Image	18
Applications	11	LAN/Dist Proc	8
Office Systems	4	Data Base	9
EDI	5	Intelligent WS	11

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NOTES:

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Information Systems Budget
External Products and Services

(Percent)

Category	'87	'88	'88 (Growth)	'89 (Growth)
Prof Services	13	13	0	-1
Proc Services	5	4	-20	1
Software	31	33	6	0
Turnkey Systems	2	7	250	0
Maintenance	36	36	0	2
Other	13	7	-46	0

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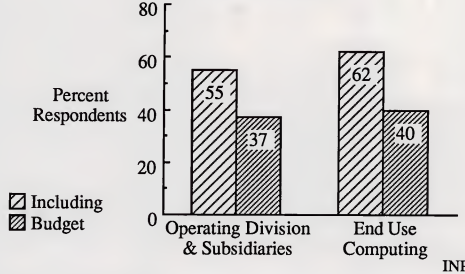
NOTES:

USM2-DT1-32

Information Systems Budget—What It Includes



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USM2-DT1-33

Information Systems Budget Conclusions

- Increased Growth in 1989 Over 1988
  - 5% versus 4%
  - Modest Personnel Growth
  - Mainframe and Micro Growth
- Unclear Forecast for External Products and Services
- Budget Shifting to the End User

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Application Development

Issues and Trends

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Application Development Key Issues

Issue	% Responses
Costs	8
Productivity & Quality	38
Responsiveness	14
Development Process	11
Organization & Direction	10
Maintenance	3
Use of Technology	16

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NOTES:

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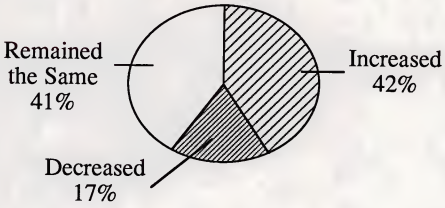
Application Development Backlog



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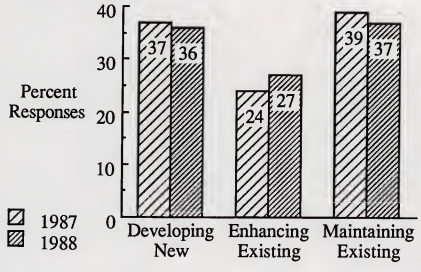
NOTES:

USM2-DT1-37

Application Development Resources
Allocation of Internal Resources



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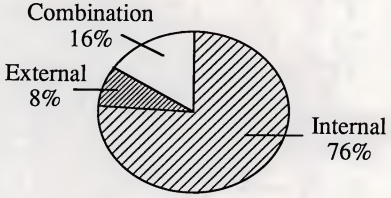
USM2-DT1-38

Application Development Resources
Source of Resources—All Development



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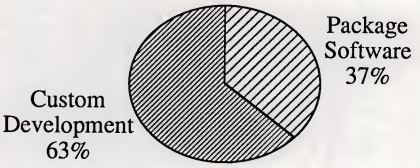
USM2-DT1-39

Application Development Resources
Source of Resources—All Development



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USM2-DT1-39a

Application Development—Major Projects
Source of Resources—Major Projects

(Percent)

Source of Resources	Package Software	Custom Development	TOTAL
Internal	22	78	56
Combined	52	48	43
External	100		1
TOTAL	35	65	100

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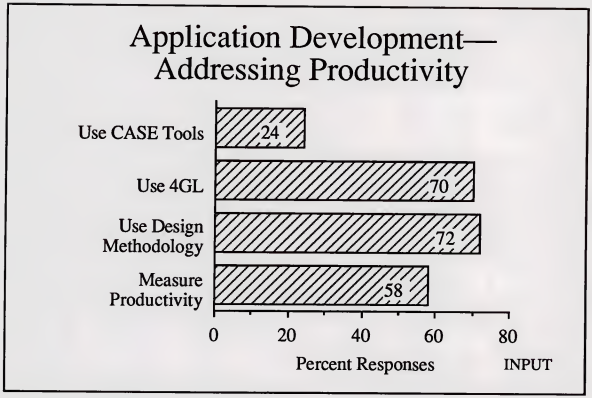

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Application Development—End-User Production Systems Development

Question	Responses (Percent)
User Depts with IS Staffs	37
Developing Production Systems	52
Type of Computer:	
Mainframe	47
Mini	28
PC	74
Percent of Total Development	20

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NOTES:

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Application Development Conclusions

- The Challenge Grows
- New Technology Being Tried
  - CASE
  - Relational DBMS
- Use of Outsiders and Package Software Will Grow
- End User Assuming an Active Role

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NOTES:

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Information Systems

Directions into the 1990s

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Information Systems

Required Changes of Emphasis
1988 - 1993

Data Processing	→	Information Flow
Information Quantity	→	Information Quality
Automation of Process	→	Improvement of Process

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User Involvement in the1990s

- Controlling Strategic Information Decisions
- Doing Majority of the Application Development
- Managing the Processing at Tier 2 and 3
- Working from a Broad Base of Experience

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NOTES:

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Information Systems Role in the 1990s

- Advisor versus Operator
- Consultant versus Developer
- Design the Architecture, Not the Application
- Run the Network, Not the Processing Points

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Information Systems Responsibilities—1990s

- Corporate Strategic Support
- Architecture Engineering
- Application Planning, Not Development
- Data Architecture and Core Data Base Management
- Network Management
- Corporate Processing, Not Distributed Processing

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NOTES:

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Information Systems Organization—1990s

- Smaller Corporate Staff
- Expert Based—Technology and Business
- Consultant Style
  - Information Engineers
  - Solution Builders
- Champions for Technology

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NOTES:

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Data Base Management

Current Trends and Challenges

(Research in Process)
June 1988

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Objectives

- Identify Data Management Trends and Issues
  - Technology
  - Responsibility
  - Resources

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Objectives

- Track Progress with Relational DBMS
  - By Information Systems
  - By End User
- Track Progress with Distributed DBMS
- Set Objectives for Data Management in 1990s

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USM2-DT2-2a

Research Demographics

- Data Administration Managers
- 100 F500-Size Corporations

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USM2-DT2-3

Research Demographics

- 10 Industries

Discrete Mfg	Process Mfg
Banking & Finance	Insurance
Transportation	Medical
Utilities	Services
Retail	Wholesale Dist'n

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NOTES:

USM2-DT2-3a

Topics

- DBMS Environment
- Data Management Function
- Relational DBMS Application
- Distributed DBMS Application
- Future Research

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DBMS Environment
How It Is Changing

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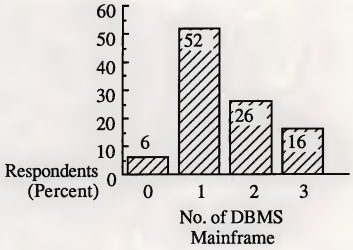
USM2-DT2-5

Mainframe DBMS Environment



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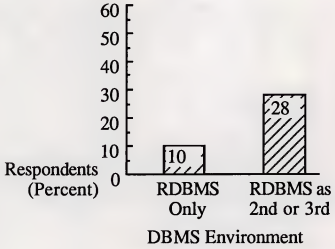
Mainframe DBMS Environment



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Minicomputer DBMS Environment

- DBMS Use
  - 58% Are Using
  - 32% Are Not Using
  - 10% Did Not Know
- RDBMS Use
  - 25% Are Using
  - 43% of Those Using DBMS

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Considering New Data Bases

- 30% Have New DBMS Under Consideration
- All Are Relational
- Most Often Mentioned Are:
  - DB2
  - Oracle
  - Ingress

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Data Management Function
How Is It Changing?

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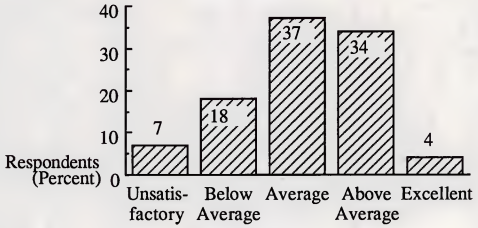
USM2-DT2-9

Effectiveness of Data Management Function



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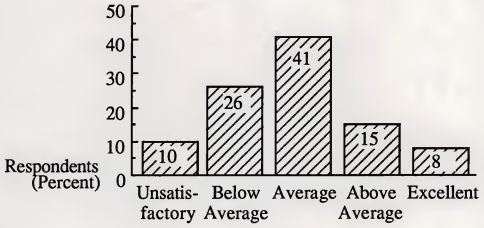
Effectiveness of Data Dictionaries



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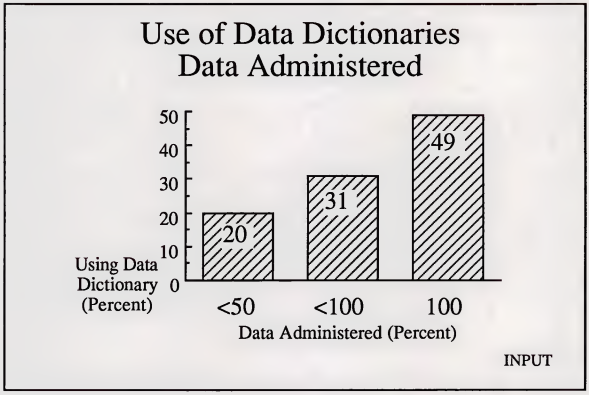

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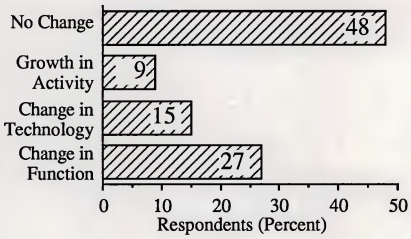
Data Management
Changing Responsibilities



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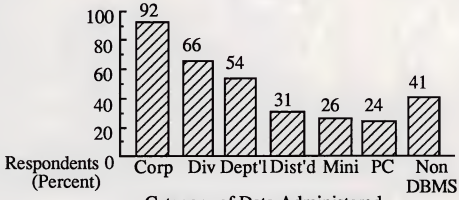
Data Administration
Breadth of Responsibility



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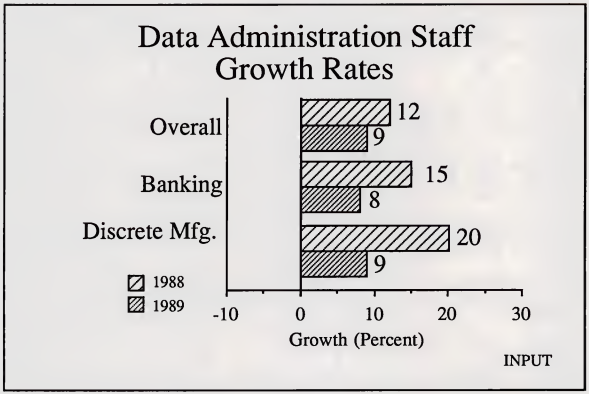

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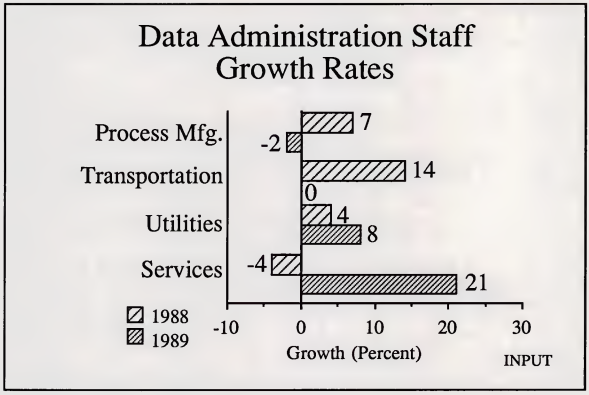

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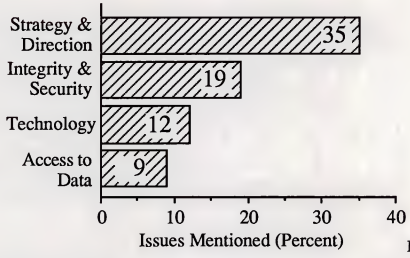
Data Management
Key Issues



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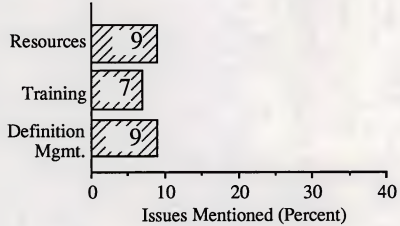
Data Management
Key Issues



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USM2-DT2-16a

Key Issues
Strategy & Direction

- Managing Distributed Data
- Ownership—User versus IS Responsibilities
- Managing Growth and Technology

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USM2-DT2-17

Key Issues
Strategy & Direction

- Planning for New Technology
- Management Support for Data Management Process

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USM2-DT2-17a

Data Management Function Conclusions

- YES, the Function Is Changing
- Broader Data Responsibilities
- Growing Staff
- Looking for an Expanded Strategy
- Major Change Is Still to Come

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NOTES:

USM2-DT2-18 & 18a

Relational DBMS Application

Who Is Using It?
and
How Is It Being Used?

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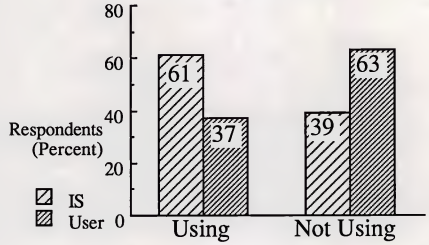
USM2-DT2-19

Relational DBMS Application
Who Is Using It?



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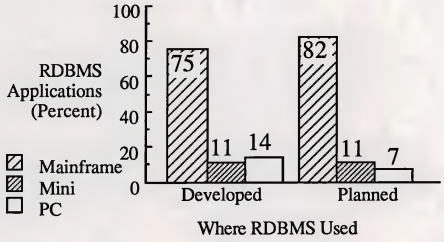
USM2-DT2-20

Relational DBMS Application
Where Is It Being Used?



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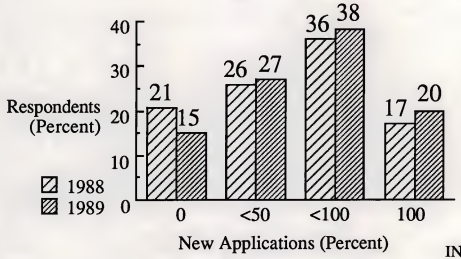
Relational DBMS Application Magnitude of Mainframe Use



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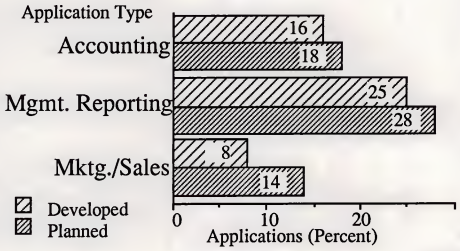
Relational DBMS Application
How Is It Being Used?



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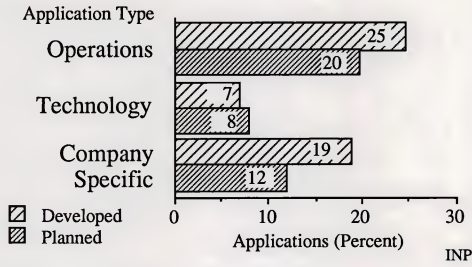
Relational DBMS Application
How Is It Being Used?



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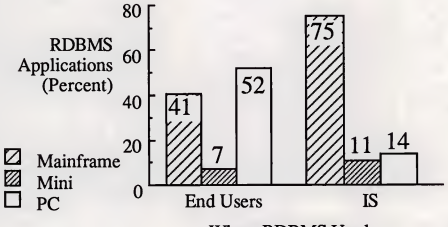
Relational DBMS Application
Where Are End Users Using It?



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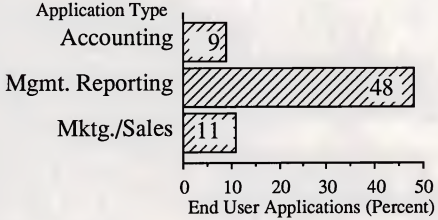
USM2-DT2-24

Relational DBMS Application
How Are End Users Using It?



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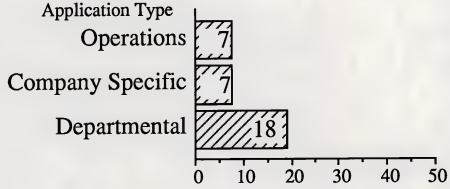
USM2-DT2-25

Relational DBMS Application
How Are End Users Using It?



INPUT

NOTES:

USM2-DT2-25a

Relational DBMS Application Conclusions

- Relational DBMS Technology Has Arrived
  - It Is out of the Pilot Stage
  - The Shift to Relational Is Speeding Up
- Users Seem to Be Adopting Relational

INPUT

NOTES:

USM2-DT2-26

Relational DBMS Application Conclusions

- Application Focus Is on Data Access and Analysis
  - Financial Reporting
  - Departmental Computing
- Learning Curve Will Soon Be Conquered

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USM2-DT2-26a

Distributed DBMS Application

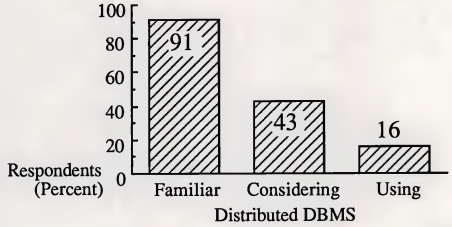
Is It Being Used?

INPUT

NOTES:

USM2-DT2-27

Distributed DBMS Application
What Is the Activity Level?



INPUT

NOTES:

USM2-DT2-28

Distributed DBMS Application Sample Applications

- Customs Clearance
- Shop Floor
- Retail Branch Operations
- Computer Aided-Engineering
- Inventory Tracking
- Departmental Reporting

INPUT

NOTES:

USM2-DT2-29

Distributed DBMS Application Conclusions

- There Is Some Experimentation
- Planning Activity Has Started
- More Smoke Than Fire

INPUT

NOTES:

USM2-DT2-30

Future Research

What Do INPUT Clients Need To Know?

- About Data Management in the 1990s
- About Using Relational DBMS
- About End Users Apply DBMS Applications
- About Planning for Distributed DBMS

INPUT

NOTES:

USM2-DT2-31

Data Management
Current Trends & Challenges
Conclusions

- The Role Is Changing
- New DBMS Technology Is Being Used
- The End User Is Developing with RDBMS
- IS Management Needs to Increase Emphasis

INPUT

NOTES:

USM2-DT2-32

Systems Integration: A Development Strategy

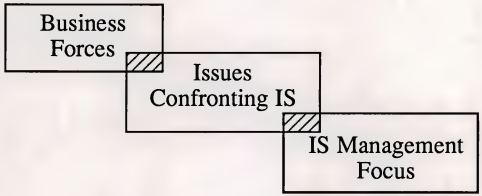
INPUT

NOTES:

USM2-DT3-1

Driving Forces, Issues & Focus

Some Fundamental Changes



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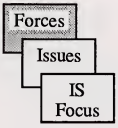
USM2-DT3-2

Business Forces



- "Bottom Line" Return
- Rapid Response & Deployment
- International Competition
- Growing Technology Investments
- Unstable Organizational Environments

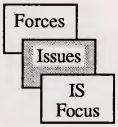
INPUT

NOTES:

USM2-DT3-3

Issues Confronting Information Systems

1987 INPUT Annual User Survey



- Rising Management Expectations
- Expanding Wealth of Technologies
- Intercompany Electronic Interaction
- User Demand for Increasingly Complex Applications
- "Mission-Critical" Systems

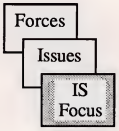
INPUT

NOTES:

USM2-DT3-4

IS Management Focus

1987 INPUT Annual User Survey



- Business Contribution
- Development Productivity
- User Involvement
- Integration (Data/Applications)
- Connectivity (Infrastructure)

INPUT

NOTES:

USM2-DT3-5

Blocking Factors

- Infrastructure Gridlock
- Lack of Qualified In-House Personnel
- Existing Applications Portfolio

INPUT

NOTES:

USM2-DT3-6

IS Management Focus

Area	Requirements
Integration	Applications/Data/ Technology
Management of IS	Productivity of IS Simplification of Support User-Managed Development

Support of Mission-Critical Systems

INPUT

NOTES:

USM2-DT3-7

IS Management Focus
Changing Emphasis

1987 - 1992

Data Processing	→	Information Flow
Information Quantity	→	Information Quality
Automation of Process	→	Process Improvement

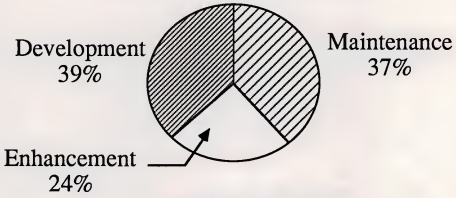
INPUT

NOTES:

USM2-DT3-8

Solving the Problem

Current Applications Staff Buried
1987 INPUT User Survey



Percentages Unchanged
for 5 Years

INPUT

NOTES:

USM2-DT3-9

Solving the Problem

Increasing Use of Outside Resources
1987 INPUT User Survey

- Professional Services
- Software Products/Packages
- Network Services
- SYSTEMS INTEGRATION

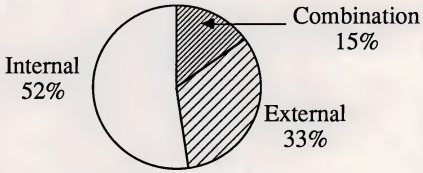
INPUT

NOTES:

USM2-DT3-10

Source of Development Resources

Banking & Finance, Insurance, Government



External up 15% since Last Survey

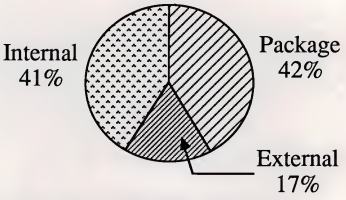
INPUT

NOTES:

USM2-DT3-11

Source of Development Resources

Manufacturing, Distribution, Transportation



External up 18% since Last Survey

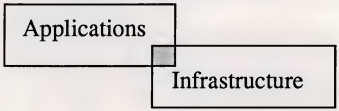
INPUT

NOTES:

USM2-DT3-12

Systems Integration

"The Provision of a Total Solution to a Multidisciplinary Information Systems Requirement"



INPUT

NOTES:

USM2-DT3-13

Systems Integration Characteristics

- Total IS Solution from Design through Implementation
- Single-Source Control with Significant Program Management Responsibility
- Single-Source Accountability

INPUT

NOTES:

USM2-DT3-14

Systems Integration Characteristics

- Application of Complex Multidisciplinary Tasks
- Assumption by Contractor of Risk

INPUT

NOTES:

USM2-DT3-14a

Systems Integration Case Study
Ashland Chemical

- Integrated Plan Operations System
- 2 Plants
- Order Entry, Inventory, Logistics, Accounting, MIS

INPUT

NOTES:

USM2-DT3-15

Ashland Chemical—Roles

Systems Integrator	Company
Project Specification	Hardware Environment
Project Management	Infrastructure
CASE Methodology	50% of Programming
Applications Software	
Customization	

INPUT

NOTES:

USM2-DT3-16

Ashland Chemical—Contract

Systems Integrator: Arthur Andersen

Size: $5.5 Million *Duration:* 30 Months

Terms: Time & Materials & Cost Plus

Schedule:

Feasibility	7/84	Award	9/85
Bid	10/84	Completion	1989

INPUT

NOTES:

USM2-DT3-17

Ashland Chemical—Components

Software Products	$ 0.7 M	13%
Professional Services	$ 4.8 M	87%

INPUT

NOTES:

USM2-DT3-18

Systems Integration Case Study
Paper Manufacturer

- Four Large & Many Smaller Non-Integrated Systems
- Multiple Mills
- Create One Integrated/Distributed Millwide System
  - Scheduling
  - Process Control
  - Materials Management

INPUT

NOTES:

USM2-DT3-19

Paper Manufacturer—Roles

Systems Integrator	Company
Specification/Project Mgt. Hardware/Systems Software Applications Development Subcontractors - Hardware - Consultant	Interface to IBM Central Network

INPUT

NOTES:

USM2-DT3-20

Paper Manufacturer—Contract

Systems Integrator: Oil Systems

Size: $6.0 Million *Duration:* 21 Months

Terms: Fixed Price

Schedule:

Feasibility	4/86	Award	9/87
Bid	8/87	Completion	6/89

INPUT

NOTES:

USM2-DT3-21

Paper Manufacturer—Components

Equipment	$3.1 M	52%
Professional Services	$1.6 M	27%
Software Development	$0.5 M	8%
Other	$0.8 M	13%

INPUT

NOTES:

USM2-DT3-22

Systems Integration Case Study—K-Mart

- Replace Existing POS System in 50% of Stores
- Develop Single Nationwide POS Plan
- Install PC-Based POS System at All Stores
- Integrate into Corporate Network

INPUT

NOTES:

USM2-DT3-23

K-Mart—Roles

Systems Integrator	Company
Project Management	Feasibility
Design/Integration	Hardware Acquisition
Software Development	Corporate Network Interface
Overnight Processing	

INPUT

NOTES:

USM2-DT3-24

K-Mart—Contract

Systems Integrator: Electronic Data Systems

Size: $143 Million

Terms: Fixed Price

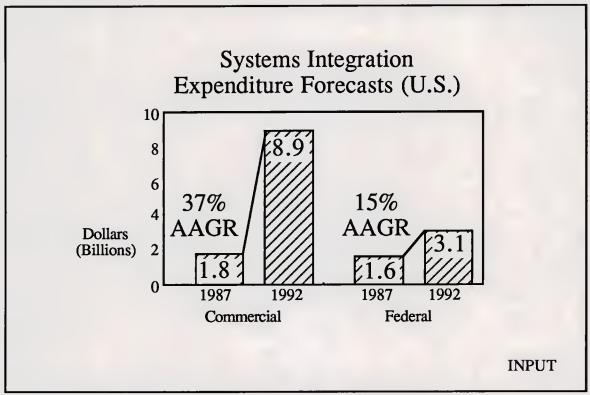
Schedule:

Feasibility	6/85	Award	6/86
Bid	2/86	Completion	1990

INPUT

NOTES:

USM2-DT3-25

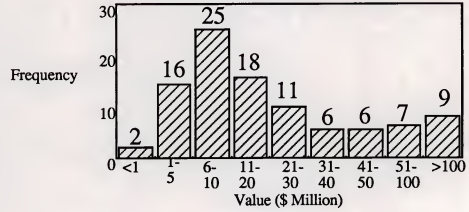


NOTES:

USM2-DT3-26

Distribution of Projects by Value
Federal & Commercial

INPUT, 1987 SI Program



INPUT

NOTES:

USM2-DT3-27

Leading Providers—Systems Integration Services

	Total	Federal	Commercial
Vendor	IBM	EDS	IBM
	EDS	CSC	AA & Co.
	AA & Co.	IBM	EDS
	CSC	MM-DS	CDC
	CDC	BCS	
	Unisys		

INPUT

NOTES:

USM2-DT3-28

Leading Providers—Systems Integration Services

	Total	Federal	Commercial
$MM	3,400	1,600	1,800
Cum. %	49	50	47

INPUT

NOTES:

USM2-DT3-29

Systems Integration Case Studies

Yield Information On:

- The Motivating Factors
- Vendor Selection Criteria
- Probability for Success

INPUT

NOTES:

USM2-DT3-30

Factors Motivating IS Management

- Limited In-House Expertise/Negative Experience
- Single-Source Solution Preferred
- Vendor "Partners" Desired
- Solutions are not Preconceived
- Recommended by Outside Consultants

INPUT

NOTES:

USM2-DT3-31

Vendor Selection Criteria

Factor	Weight (Percent)
Technical Credibility of Solution	40
Risk Avoidance	
- Experience/Capabilities	30
- Project Management Approach	10
Cost:	20

INPUT

NOTES:

USM2-DT3-32

The Risk Equation

"Over 35% of All Development Projects Fail to Meet Delivery Date or Cost Objectives."

INPUT

NOTES:

The Risk Equation

Factors Include:

- Interference with Current Operations
- Lack of Experience with Required Technologies
- Financial Exposure
- Internal Lack of Focus

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NOTES:

USM2-DT3-33a

Summary

- Changing Environments Are Motivating the Trend to Systems Integration
- Opportunities for Successful Deployment

INPUT

NOTES:

USM2-DT3-34

Systems Solutions are Changing

Factor	Traditional	Future
Complexity	Modest	Significant
Technology	Standard	Multiple
Organization	Single Dept.	Multi-departmental
Orientation	Automation	Improvement
Value	Operational	Strategic

INPUT

NOTES:

USM2-DT3-35

Development Processes Evolving

Factor	Traditional	Future
Responsibility	Info. Systems	User Driven
Risk	Tactical	Strategic
Project Mgt.	Info. Systems	IS and Vendor
Appl. Knowledge	Internal	Internal/ External
Solution	Single Vendor	Multivendor

INPUT

NOTES:

USM2-DT3-36

Opportunities for Successful Deployment

Lack of In-House Capability

- Large Backlog
- Technical Expertise
- Integration Mgt. Experience
- Applications Expertise

INPUT

NOTES:

USM2-DT3-37

Opportunities for Successful Deployment

Solution Complexity

- Solution Undefined
- New Technologies
- Network-Based Design
- Multivendor Environment

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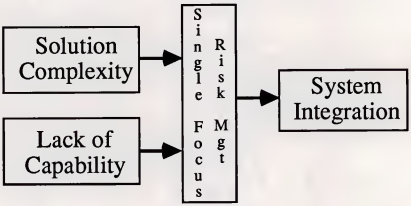
NOTES:

USM2-DT3-38

Opportunities for Successful Deployment



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USM2-DT3-39